Attorney's Docket No. <u>80,113-0079 (GEN-079)</u>(D2344)
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of
Inventor(s): **Christopher POLI; Christopher S. DEL SORDO; Douglas S. MAKOFKA; Jack BIRNBAUM; Thomas F. BATES IV; Dave PREZUHY; and Ira S. LEHRMAN**

For: **METHOD AND SYSTEM FOR DIRECTING THE DOWNLOAD OF SOFTWARE AND FIRMWARE OBJECTS OVER A NETWORK SUCH AS A CABLE TELEVISION SYSTEM**

1.   **Type of Application**
     This new application is for a(n)

     ☒   Original (nonprovisional)

     ☐   Design

           ☐   Plant

     ☐   Divisional

     ☐   Continuation

     ☐   Continuation-in-part (C-I-P)

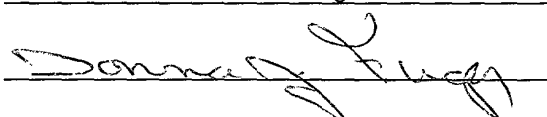2.   **Benefit of Prior U.S. Application(s)** (35 U.S.C. 119(e) 120, or 121)

     ☒   The new application being transmitted claims the benefit of prior U.S. application(s) and enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

Serial No.: **60/152,286**   Filed: **September 3, 1999**   Status: **Pending**

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date <u>July 21, 2000</u> in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number <u>EL 489 897 790 US</u> addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Donna J. Fuga

EXPRESS LABEL NO. EL 489 897 790 US

3. **Papers Enclosed That Are Required for Filing Date under 37 CFR 1.53(b) (Regular) or 37 CFR 1.153 (Design) Application**

   __17__ Pages of specification

   __4__ Pages of claims

   __1__ Pages of Abstract

   __4__ Sheets of Drawing

   ☒ formal

   ☐ informal

   ☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)". 37 CFR 1.84(b).

4. **Additional papers enclosed**

   ☐ Preliminary Amendment

   ☐ Information Disclosure Statement (37 CFR 1.98)

   ☐ Form PTO-1449

   ☐ Citations

   ☐ Declaration of Biological Deposit

   ☐ Submission of "Sequence Listing", computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

   ☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

   ☐ Special Comments

   ☐ Other

5. **Declaration or oath**

   ☒ Enclosed

   Executed by

   ☒ inventor(s).

   ☐ legal representative of inventor(s).

   ☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

   ☐ This is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. See item 13 below for fee.

   ☐ Not enclosed.

☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of all the above named inventor(s).

    ☐ Showing that the filing is authorized.

6.   Inventorship Statement

The inventorship for all the claims in this application are:

☐ The same.

<div align="center">or</div>

☐ Not the same. An explanation, including the ownership of the various claims at the time last claimed invention was made,

    ☐ is submitted

    ☐ will be submitted.

7.   Language

☒ English

☐ Non-English

    ☐ The attached translation is a verified translation. 37 CFR 1.52(d).

8.   Assignment

☒ An assignment of the invention to <u>GENERAL INSTRUMENT CORPORATION</u>.

    ☒ is attached. A separate ☒ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

    ☐ will follow.

9.   Certified copy

Certified copy(ies) of application(s)

country	appln. no.	filed
country	appln. no.	filed
country	appln. no.	filed

from which priority is claimed

    ☐ is (are) attached.
    ☐ will follow.

10.   Fee Calculation (37 CFR 1.16)

A.   ☒   Regular application.

CLAIMS AS FILED			
Number Filed	Number Extra	Rate	Basic Fee 37 CFR 1.16(a) $ 690.00
Total Claims (37 CFR 1.16(c)	20-20 = 0	X $ 22.00	0000
Independent Claims (37 CFR 1.16(b))	2 -3 = 0	X $ 80.00	00.00
Multiple dependent claims, if any, (37 CFR 1.16(d))		X $ 260.00	00.00

☐ Amendment canceling extra claims enclosed.

☐ Amendment deleting multiple-dependencies enclosed

☐ Fee for extra claims is not being paid at this time.

Filing Fee Calculation $ 690.00

B.   ☐ Design application   ($310.00-37 CFR 1.16(f))
Filing Fee Calculation $ _____

C.   ☐ Plant application   ($510.00-37 CFR 1.16(g))
Filing Fee Calculation $ _____

11.   Small Entity Statement(s)

☐ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is (are) attached.
☐ Status as a small entity was claimed in prior application serial no. _____, filed on _____, from which benefit is being claimed for this application under:

35 U.S.C.   ☐ 119(e),

☐ 120,

☐ 121,

☐ 365(c),

and which status as a small entity is still proper and desired.

☐ A copy of the verified statement in the prior application is included.

Filing Fee Calculation (50% of **A, B** or **C** above) $ _____

12.   Request for International-Type Search (37 CFR 1.104(d))

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13.   Fee Payment Being Made At This Time

☐ Not enclosed.

    ☐ No filing fee is to be paid at this time.

☒ Enclosed

☒ Basic filing fee	$	690.00
☒ Recording assignment ($40.00; 37 CFR 1.21(h)) (See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION".)	$	40.00
☐ Petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to or cannot be reached. ($130.00, 37 CFR 1.47 and .17(h))	$	
☐ For processing an application with a specification in a non-English language. ($130.00; 37 CFR 1.52(d) and 1.17(k).	$	
☐ Processing and retention fee ($130.00; 37 CFR 1.153(d) and 1.21 (i)	$	
☐ Fee for international-type search report ($40.00; 37 CFR 1.21(e))	$	
Total fees enclosed	$	730.00

14.   Method of Payment of Fees

☐ Check in the amount of $_____.

☒ Charge Deposit Account No. 18-0013 in the amount of $**730.00**. A duplicate of this transmittal is attached.

15.   Authorization to Charge Additional Fees

☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Deposit Account No. 18-0013

    ☒ 37 CFR 1.16(a), (f) or (g) (filing fees)

    ☒ 37 CFR 1.16(b), (c) and (d) (presentation of extra claims)

    ☒ 37 CFR 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

    ☒ 37 CFR 1.17 (application processing fees)

    ☐ 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b))
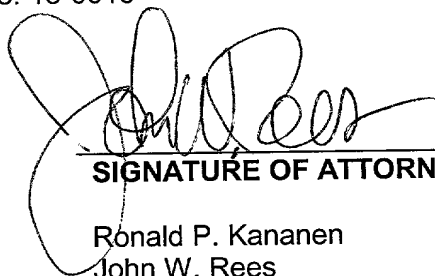
16. Instructions as to Overpayment

☒ Credit Deposit Account No. 18-0013

☐ Refund

Date: July 21, 2000

_____
SIGNATURE OF ATTORNEY

Reg. No. 24,104
Reg. No. 38,278
Telephone No. (248) 594-0624

Customer No. 010291

Ronald P. Kananen
John W. Rees
Rader, Fishman & Grauer PLLC
39533 Woodward Ave.
Suite 140
Bloomfield Hills, MI 48304

☒ **Incorporation by reference of added pages**

☒ Plus added pages for New Application Transmittal where benefit of prior U.S. application(s) claimed

Number of pages added __5__

☐ Plus Added Pages for Papers Referred to in item 4 above

Number of pages added ____

☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added

☐ **Statement Where No Further Pages Added**

☐ This transmittal ends with this page.

R0088663.DOC

ADDED PAGES FOR APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED

NOTE·   See 37 C F.R § 1 78.

17. Relate Back

WARNING: *If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. 120, 121 or 365(c). (35 U S.C. 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S C. 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.*

(complete the following, if applicable)

☒ Amend the specification by inserting, before the first line, the following sentence:

A.   35 U.S.C. 119(e)

NOTE·   "Any nonprovisional application claiming the benefit of one or more prior filed copending provisional applications must contain or be amended to contain in the first sentence of the specification following the title a reference to each such prior provisional application, identifying it as a provisional application, and including the provisional application number (consisting of series code and serial number)." 37 C.F R. § 1 78(a)(4).

☒ "This application claims the benefit of U.S. Provisional Application(s) No(s).:

APPLICATION NO(S).:	**FILING DATE**
60/152,286	09/03/1999

B.   35 U.S.C. 120, 121 and 365(c)

NOTE: "Except for a continued prosecution application filed under § 1.53(d), any nonprovisional application claiming the benefit of one or more prior filed copending nonprovisional applications or international applications designating the United States of America must contain or be amended to contain in the first sentence of the specification following the title a reference to each such prior application, identifying it by application number (consisting of the series code and serial number) or international application number and international filing date and indicating the relationship of the applications. . . . Cross-references to other related applications may be made when appropriate." (See § 1 14(a)). 37 C.F.R. § 1.78(a)(2).

☐ "This application is a

    ☐ continuation

    ☐ continuation-in-part

    ☐ divisional

of copending application(s)

☐ application number _____ filed on _____ "

☐ International Application _____ filed on _____ and which designated the U.S."

NOTE: *The proper reference to a prior filed PCT application that entered the U.S. national phase is the U.S. serial number and the filing date of the PCT application that designated the U.S.*

NOTE: *(1) Where the application being transmitted adds subject matter to the International Application, then the filing can be as a continuation-in-part or (2) if it is desired to do so for other reasons then the filing can be as a continuation.*

NOTE: *The deadline for entering the national phase in the U.S. for an international application was clarified in the Notice of April 28, 1987 (1079 O.G. 32 to 46) as follows:*

"The Patent and Trademark Office considers the International application to be pending until the 22nd month from the priority date if the United States has been designated and no Demand for International Preliminary Examination has been filed prior to the expiration of the 19th month from the priority date and until the 32nd month from the priority date if a Demand for International Preliminary Examination which elected the United States of America has been filed prior to the expiration of the 19th month from the priority date, provided that a copy of the international application has been communicated to the Patent and Trademark Office within the 20 or 30 month period respectively. If a copy of the international application has not been communicated to the Patent and Trademark Office within the 20 or 30 month period respectively, the international application becomes abandoned as to the United States 20 or 30 months from the priority date respectively. These periods have been placed in the rules as paragraph (h) of § 1.494 and paragraph (i) of § 1.495. A continuing application under 35 U.S.C. 365(c) and 120 may be filed anytime during the pendency of the international application."

☐ "The nonprovisional application designated above, namely application _____, filed _____, claims the benefit of U.S. Provisional Application(s) No(s).:

APPLICATION NO(S).:   **FILING DATE**

☐ Where more than one reference is made above please combine all references into one sentence.

18. Relate Back—35 U.S.C. 119 Priority Claim for Prior Application

The prior U.S. application(s), including any prior International Application designating the U.S., identified above in item 17B, in turn itself claim(s) foreign priority(ies) as follows:

Country	Appln. no.	Filed

The certified copy(ies) has (have)

☐ been filed on _____, in prior application _____, which was filed on _____.

☐ is (are) attached.

WARNING: *The certified copy of the priority application that may have been communicated to the PTO by the International Bureau may not be relied on without any need to file a certified copy of the priority application in the continuing application. This is so because the certified copy of the priority application communicated by the International Bureau is placed in a folder and is not assigned a U.S. serial number unless the national stage is entered. Such folders are disposed of if the national stage is not entered. Therefore, such certified copies may not be available if needed later in the prosecution of a continuing application. An alternative would be to physically remove the priority documents from the folders and transfer them to the continuing application. The resources required to request transfer, retrieve the folders, make suitable record notations, transfer the certified copies, enter and make a record of such copies in the Continuing Application are substantial. Accordingly, the priority documents in folders of international applications that have not entered the national stage may not be relied on. Notice of April 28, 1987 (1079 O.G. 32 to 46).*

19. Maintenance of Copendency of Prior Application

NOTE: *The PTO finds it useful if a copy of the petition filed in the prior application extending the term for response is filed with the papers constituting the filing of the continuation application. Notice of November 5, 1985 (1060 O.G. 27).*

A. ☐ Extension of time in prior application

*(This item **must** be completed and the papers filed **in the prior application,** if the period set in the prior application has run.)*

☐ A petition, fee and response extends the term in the pending **prior** application until

☐ A **copy** of the petition filed in prior application is attached.

B. ☐ Conditional Petition for Extension of Time in Prior Application

(complete this item, if previous item not applicable)

☐ A conditional petition for extension of time is being filed in the pending **prior** application.

☐ A **copy** of the conditional petition filed in the prior application is attached.

20. Further Inventorship Statement Where Benefit of Prior Application(s) Claimed

(complete applicable item (a), (b) and/or (c) below)

(a) ☐ This application discloses and claims only subject matter disclosed in the prior application whose particulars are set out above and the inventor(s) in this application are

    ☐ the same.

    ☐ less than those named in the prior application. It is requested that the following inventor(s) identified for the prior application be deleted:

(type name(s) of inventor(s) to be deleted)

(b) ☐ This application discloses and claims additional disclosure by amendment and a new declaration or oath is being filed. With respect to the prior application, the inventor(s) in this application are

    ☐ the same.

    ☐ the following additional inventor(s) have been added:

(type name(s) of inventor(s) to be deleted)

(c) ☐ The inventorship for all the claims in this application are

    ☐ the same.

    ☐ not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made

        ☐ is submitted.

        ☐ will be submitted.

21. Abandonment of Prior Application *(if applicable)*

☐ Please abandon the prior application at a time while the prior application is pending, or when the petition for extension of time or to revive in that application is granted, and when this application is granted a filing date, so as to make this application copending with said prior application.

NOTE: According to the Notice of May 13, 1983 (103, TMOG 6-7), the filing of a continuation or continuation-in- part application is a proper response with respect to a petition for extension of time or a petition to revive and should include the express abandonment of the prior application conditioned upon the granting of the petition and the granting of a filing date to the continuing application.

22. Petition for Suspension of Prosecution for the Time Necessary to File an Amendment

WARNING: *"The claims of a new application may be finally rejected in the first Office action in those situations where (1) the new application is a continuing application of, or a substitute for, an earlier application, and (2) all the claims of the new application (a) are drawn to the same invention claimed in the earlier application, and (b) would have been properly finally rejected on the grounds of art of record in the next Office action if they had been entered in the earlier application." MPEP, § 706.07(b), 6th ed., rev.2.*☐

NOTE: *Where it is possible that the claims on file will give rise to a first action final for this continuation application and for some reason an amendment cannot be filed promptly (e.g., experimental data is being gathered) it may be desirable to file a petition for suspension of prosecution for the time necessary.*

(check the next item, if applicable)

☐ There is provided herewith a Petition To Suspend Prosecution for the Time Necessary to File An Amendment (New Application Filed Concurrently)

23. Small Entity (37 CFR § 1.28(a))

☐ Applicant has established small entity status by the filing of a statement in parent application _____ on _____.

☐ A copy of the statement previously filed is included.

WARNING: See 37 CFR § 1.28(a).

24. NOTIFICATION IN PARENT APPLICATION OF THIS FILING

☐ A notification of the filing of this
(check one of the following)

☐ continuation

☐ continuation-in-part

☐ divisional

is being filed in the parent application, from which this application claims priority under 35 U.S.C. § 120.

R0088664.DOC

RADER, FISHMAN AND GRAUER PLLC
39533 WOODWARD AVENUE, SUITE 140
BLOOMFIELD HILLS, MI 48304

UNITED STATES PATENT APPLICATION

of

Christopher POLI
a citizen of USA
residing at 2607 Red Gate Drive
Doylestown, PA 18901

Christopher S. DEL SORDO
a citizen of USA
residing at 229 Heatherfield Drive
Souderton, PA 18964

Douglas S. MAKOFKA
A citizen of USA
Residing at 516 Fairhill Street
Willow Grove, PA 19090

Jack BIRNBAUM
a citizen of the USA
residing at 559 Nicole Drive
Southhampton, PA 18966

Thomas F. BATES IV
a citizen of the USA
residing at 115 Tanyard Road
Richboro, PA 18954

Dave PREZUHY
a citizen of the USA
residing at 3398 Pin Oak Lane
Chalfont, PA 18914; and

Ira S. LEHRMAN
a citizen of the USA
residing at 10976 Puma Run
Littleton, CO 80124

for new and useful invention entitled:

METHOD AND SYSTEM FOR DIRECTING THE DOWNLOAD OF SOFTWARE AND FIRMWARE OBJECTS OVER A NETWORK SUCH AS A CABLE TELEVISION SYSTEM

TITLE OF THE INVENTION

Method and System for Directing the Download of Software and Firmware Objects over a Network such as a Cable Television System

5 FIELD OF THE INVENTION

The present invention relates to the field of programming a set-top terminal of a cable television system, particularly upgrading or expanding the software or firmware in the set-top terminal. More particularly, the present invention relates to the field of directing individual terminals or a group of terminals to acquire a new or

10 upgraded programming object or list of objects over the cable television system.

BACKGROUND OF THE INVENTION

In a typical cable television system, subscribers are provided with a set-top box or terminal. The set-top terminal is a box of electronic equipment that is used to

15 connect the subscriber's television, and potentially other electronic equipment, with the cable network. The set-top box is usually connected to the cable network through a co-axial wall outlet.

The set-top box is essentially a computer that is programmed to process the signals from the cable network so as to provide the subscriber with the cable services.

20 These services from the cable television company typically include access to a number of television channels. Additional, premium channels may also be provided to subscribers at an additional fee. Pay-per-view events may also be provided over the cable network. The set-top box is programmed to provide these services to subscriber.

25 However, the services of the cable company need not be limited to providing television programming. Some cable companies are now offering internet access and e-mail over the cable network at speeds much faster than are available over conventional telephone lines. It is anticipated in the future that more and more services will be commonly provided over cable networks, including video-on-demand

30 and even basic telephone service. Eventually, each home or office may have a single connection, via the cable network, to all electronic data services.

1

As the cable network and the services provided evolve, the set-top terminal must also evolve to be able to provide subscribers with all the services of the cable network. This set-top box evolution will primarily involve changes to the programming of the set-top box. By upgrading the software or firmware of the set-top box, the box can be made to perform more efficiently or offer new services as the cable network evolves.

In order to upgrade the population of set-top boxes on a cable network, it is preferable to transmit the new programming to the set-top boxes via the cable network itself. Otherwise, a technician must visit each subscriber to upgrade the set-top boxes. Such field upgrades would obviously be at significant expense to the system operator.

The headend is the facility from which the cable network operator broadcasts television signals and provides other services over the cable network. Updated software that is provided to the population of set-top terminals can be broadcast from the headend over the cable network. Messages giving instructions or information to the set-top terminals can also be broadcast from the headend. Messages and programming are routinely broadcast by the headend over the cable network.

These messages and programming are typically "packetized," meaning that the data of the message or the software or firmware is divided into discrete "packets" or segments of data. Each packet includes a header that identifies the message or object of which that packet is a part and identifies the position of that packet's data within that message or object. Consequently, the set-top terminal can collect the packets of the message or object it is trying to acquire and reassemble the packetized data into the message or object sent by the headend. The packets of each data object being transmitted bear a unique packet identifier (PID), typically a number, or other identifier within the PID stream that identifies the packets as belonging to a particular data object being transmitted.

With transmitted data objects being packetized, numerous data objects can be broadcast simultaneously by interspersing or "carouseling" the packets of the various objects being transmitted. The packets of each object may be continuously transmitted and retransmitted for a period of time to give set-top terminals a continuing opportunity to acquire the object. These streams of data packets can be

2

sent on both in-band and out-of-band (OOB) channels of the cable signal sent from the headend to the set-top terminals.

Conventionally, the first packet of each object being transmitted, designated as segment 0 (zero), contains information about the size and nature of the packetized object which is necessary for the set-top terminal to acquire and use before downloading and reconstructing the object. Consequently, under conventional protocols, the set-top terminal waits to receive segment 0 of the object it is trying to acquire before commencing the actual downloading of the object itself. As a result, segment 0 may be retransmitted by the headend more frequently than the other segments or packets of the data object so as to more readily provide the set-top terminal with the data necessary to begin a download of the object.

As noted, the system operator will periodically need to upgrade the programming of the set-top terminals to accommodate upgrades or additional services offered within the system as the system evolves. In some cases, newer set-top terminals may be placed in service ready to accommodate the latest system services and protocols and only older terminals may need to be re-programmed. Thus, it is important for the headend to be able to direct specific terminals, or an identified group of terminals, to download and implement new programming.

In previous systems, it has been difficult for the headend to order set-top terminals to download and implement new programming. Under conventional system protocols, the headend has been required to send multiple messages to the set-top terminals in order to specify the identity of an object that set-top terminals are to download and provide the instruction to acquire the object. The set-top terminal then, using standard protocols, searches the incoming control channels and datastreams from the headend for the stream containing the identified object to be downloaded. Once the appropriate datastream for the object is located, the set-top terminal must wait for segment 0 of the object and the information that segment 0 contains before downloading of the object begins. Additional signaling from the headend is required to authorize and enable the set-top terminal to implement the new programming.

Consequently, there is a need in the art for an improved system of managing the programming in a population of set-top terminals in a cable television system.

Specifically, there is a need in the art for a simplified and improved method and system with which a headend facility can direct set-top terminals to download and implement specified programming code objects.

5   SUMMARY OF THE PRESENT INVENTION :

The present invention meets the above-identified need and others. Specifically, it is an object of the present invention to provide a method and system by which a headend facility can easily direct set-top terminals to download and implement specified programming code objects.

10   In summary, the present invention provides a new protocol, including a single message that can be sent from the headend to set-top terminals to cause those terminals to instantly acquire and implement new programming being offered over the cable network. The new message provides all the information needed by the set-top terminal to instantly begin acquisition of the specified object. For example, the

15   message will identify the object, identify the control channel and PID or URL at which the object can be downloaded by the set-top terminal and provide the information about the object that was formerly provided in segment 0 so that the set-top terminal need not wait for segment 0 to begin acquisition of the object. The new message of the present invention can also provide all the information necessary to

20   enable the set-top terminal to authenticate and implement the new object.

More specifically, the present invention may be embodied and described as a method of controlling the downloading of code and data objects by a set-top terminal in a cable television system by transmitting a download control message to the set-top terminal, where the download control message specifies an object to be downloaded,

25   the size of the object and the location of the object such that the set-top terminal is enabled to commence downloading the object upon receipt of the download control message. In other words, no other information is necessary to allow the terminal to begin acquiring the designated object. The download control message of the present invention may be embedded in an entitlement management message that is routinely

30   transmitted from a headend facility to the set-top terminal.

4

The location of the object may be specified by the download control message by identifying a channel with a transport stream on which the object is transmitted and a packet identifier identifying the data packets of the object within that transport stream. Alternatively, the location of the object may be specified by the download

5   control message by listing a URL at which the object is stored.

The object specified may be a programming code object for execution by the set-top terminal. Following receipt of the download control message, the method of the present invention next includes downloading the specified code object in accordance with the download control message.

10   Preferably, the download control message further specifies an entitlement control data structure associated with the programming code object being acquired. In this case, the method of the present invention further includes downloading the specified entitlement control data structure in accordance with the download control message. After the code object and entitlement control data structure are acquired, the

15   object is authenticated and authorized using the downloaded entitlement control data structure.

During the downloading of the object specified by the download control message, a system glitch or system operator action may interrupt the download. Consequently, the method of the present invention includes terminating the download

20   if a timer exceeds a set limit prior to receipt of a next successive data packet of the object being downloaded.

The method of the present invention also preferably includes specifying, with the download control message, an operating environment of the set-top terminal in which the terminal is to respond to the download control message, i.e., is the terminal

25   running and controlled by a platform object or a system object. According to the present invention, downloading of the object specified by the download control message will only proceed if the set-top terminal is in the operating environment specified by the download control message.

Finally, the method of the present invention further includes specifying with

30   the download control message an address or characteristic of the set-top terminal. Consequently, downloading the specified object in accordance with the download

control message is performed only if the set-top terminal bears an address or characteristic matching the address or characteristic specified in the download control message.

The present invention also encompasses a corresponding system for controlling the downloading of code and data objects by a set-top terminal in a cable television system. The system includes a set-top terminal connected to a cable television system; and means for transmitting a download control message to the set-top terminal. As above, the download control message specifies an object to be downloaded, a size of the object and a location of the object such that the set-top terminal is enabled to commence downloading the object upon receipt of the download control message.

BRIEF DESCRIPTION OF THE DRAWINGS:

The drawings are a part of the specification and may be used to better understand the present invention. In the drawings:

Fig. 1 is a block diagram of a cable network including a headend and population of set-top terminals with which the present invention is practiced.

Fig. 2 is a flowchart illustrating operation of the system of the present invention using the Download Control Message of the present invention.

Fig. 2A is a flowchart illustrating operation of a second embodiment of the system of the present invention using the Download Control Message of the present invention.

Fig. 3 is a flowchart further detailing the actual downloading step of Figs. 2 and 2A according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION:

According to the present invention a new protocol is defined including a message for directing and enabling a set-top terminal or group of terminals to instantly download and implement a software or firmware object or group of objects. As will be described in detail below, this Download Control Message contains all the information necessary to allow the set-top terminal to instantly begin acquiring the

specified object or group of objects. Preferably, the Download Control Message of the present invention is transmitted as a subcommand within the Entitlement Management Message (EMM) which is routinely communicated between the headend and the set-top terminals.

5   As shown in Fig. 1, the headend facility (101) is connected via a cable network (103) to a population of set-top terminals (102). Each set-top terminal (102) is possessed and used by a particular subscriber to the cable service. Each set-top terminal (102) is programmed to provide those services available over the cable service that the subscriber has paid to receive.

10   In addition to providing services, such as a cable television signal, the headend (101) can also transmit code and data objects to the set-top terminals (102) over the cable network. In the event that changes to the system (103) or the services offered require the set-top terminals (102) to receive additional or upgraded programming, the headend (101) can transmit the Download Control Message of the present invention to

15   cause the terminals (102) to download the new programming which is broadcast over the cable network (103) to the terminals (102).

Referring to Fig. 2, this method of the present invention for controlling the downloading of code objects by set-top terminals (102) within a cable television system is illustrated. As shown in Fig. 2, the headend (101) sends a Download

20   Control Message (201) according to the present invention. This Message is received (202) by the set-top terminals (102) in the system.

Within the network (103), each set-top terminal (102) may have a specific address and one or more multi-cast addresses such that the headend (101) can direct messages to specific set-top terminals or to defined groups of terminals sharing a

25   particular multi-cast address. Alternatively, a message can be directed to a particular group of terminals using a preamble characteristic (i.e. distinguishing information within the system or set-top that can be appended to a message causing specific set-top terminals to accept and implement that message). The message is ignored by set-top terminals not having the specified preamble characteristic.

30   Within the scope of the present invention, the Download Control Message may be broadcast to all set-top terminals (102) within the network, multi-cast to a

particular group of terminals (e.g., 102A and 102B) or single-cast to a particular terminal (e.g., 102A). In this way, the service provider can target upgraded programming to only that class or classes of set-top terminals (102) needing the upgrade. This allows the service provider to account for differences between types and installation dates of the terminals (102) connected to the system (103).

As shown in Fig. 2, when a Download Control Message is received by a set-top terminal (102), the processor (111) of the terminal (102) will check the address or preamble characteristics associated with the Message against the single- or multi-cast addresses, or preamble characteristics, assigned to that terminal. (203). If the address or preamble characteristics of the Message match the terminal, the terminal (102) will accept and implement the Download Control Message. Otherwise, the Message is ignored by the terminal (102).

The Message may also contain an operating environment flag. This flag will specify, for example, the operating environment of the set-top terminal in which the Download Control Message will be accepted and executed by the set-top terminal (102) based purely on the object class of the object to be acquired, e.g., whether the object is a platform or system object. If the flag is set to "any" environment (which is the default setting), then the set-top terminal (102) will accept and execute the instructions of the Message regardless of whether the set-top terminal (102) is operating in either the platform object or system object environment. If the flag is set to "platform object," the set-top terminal (102) will only accept and execute the Download Control Message if a platform object is running on and in control of the set-top terminal (102). Alternatively, if the flag is set to "system object," the set-top terminal (102) will only accept and execute the Download Control Message if a system object is running on and in control of the set-top terminal (102). As will be understood by those skilled in the art, a system object is an operating system object which, when running, allows the set-top terminal to acquire and execute additional applications that provide advanced services to the subscriber. A platform object is a more basic code object that is typically run by the set-top terminal prior to acquiring or starting the operating system and which may allow the set-top terminal to provide only basic services.

As shown in Fig. 2, the set-top terminal (102) receiving a Download Control Message will check the Message for an operating environment flag (204). If a flag is found, the terminal (102) will determine if its operating environment matches (205) the designation of the flag, i.e., all (automatic match), system or platform. If the operating environment flag is not present, is set to "all" or matches the actual operating environment of the set-top terminal, the terminal (102) will proceed to accept and execute the instructions of the Download Control Message.

The information necessary to download a specified code or data object is extracted from the Download Control Message (206) by the processor (111) of the set-top terminal (102). The Download Control Message of the present invention provides all the information necessary to allow the set-top terminal (102) to instantly begin acquisition of a specified programming object. For example, the Download Control Message identifies for the set-top terminal (102) the identity and location of each listed code object and its corresponding entitlement control data structure (ECDS). The ECDS is a data structure transmitted or stored separately from its corresponding code object that contains information about the code object used to authorize and authenticate the code object.

To specify the location of a code object or its ECDS, the Download Control Message specifies the channel or frequency of the transport stream, in-band or out-of-band, at which the packets for the code object or ECDS are being transmitted, and perhaps carouseled with the packets of other data objects. Each set-top terminal (102) includes a tuner (110) controlled by the terminal's processor (111) that can be used to tune any transport stream specified by the Download Control Message as carrying the object to be acquired. The set-top terminal (102) then tunes to that transport stream (207). The Download Control Message may also specify the PID of the packets carrying the code object or ECDS to be acquired. The set-top terminal (102) can then acquire all the packets with that PID number and reassemble the collected data into the desired programming code object or its ECDS (208).

Additionally, in some areas, local cable systems operate with virtual channels requiring multiple channel maps. Consequently, the Download Control Message of the present invention may include a virtual channel identification field to allow for

proper specification of the location of a data stream providing the packets of an object or its ECDS to be downloaded in such a virtual channel system.

Alternatively, as shown in Fig. 2A, the cable network (103) may be organized as computer network using URLs or universal resource locators to specify the address

5   of downloadable code objects. Consequently, the Download Control Message may specify the location of a listed code object and its corresponding ECDS by URL for download by the set-top terminal (102). Consequently, the set-top terminal (102) can address the specified URL (207A) and acquire the desired code object or corresponding ECDS (208).

10   The ECDS may be on a different data transport stream requiring the terminal (102) to tune a different channel in order to acquire it. Alternatively, the ECDS may reside at a different URL than the corresponding code object. Thus, the set-top terminal (102) may have to address a second URL to acquire the ECDS. The necessary data to locate the ECDS is, as noted, included in the Download Control

15   Message of the present invention.

Using the data of the ECDS, the set-top terminal (102) can verify that it has downloaded the appropriate code object and that the code object has been received correctly without inadvertent or malicious alteration (209). It is obviously important for the set-top terminal (102) to be able to authenticate and authorize the received

20   code object before that object is executed by the set-top terminal (102). The ECDS may also specify a valid time period or lifetime for the corresponding code object.

The Download Control Message of the present invention also contains information about the size and nature of the object to be downloaded. This information corresponds to the information conventionally provided in segment 0 of

25   the object when the object is packetized for transmission. Consequently, the Download Control Message of the present invention gives the set-top terminal (102) the data required to control the download of the object so that the terminal (102) need not wait for a transmission of segment 0 of the object before beginning the download. The terminal (102) can begin collecting any packets or segments identified as

30   belonging to the object being downloaded immediately. The collection continues until all the packets are acquired and can be reassembled into the desired object. By

way of example, the terminal (102) may begin by receiving packet 50 of 100, collect packets 51 to 100, then collect packets 0 to 49 and reassemble the object. The terminal (102) need not wait for any particular point in the carousel of packets before beginning acquisition.

5   This occasions another modification in the system of the present invention. Under conventional systems, set-top terminals would implement a timer to record the length of time waiting to receive segment 0 of an object to be downloaded. When a predetermined period of time elapsed without the arrival of segment 0, the timer could be used to "time-out" or terminate the attempted acquisition of the data object. This

10   timeout feature prevents the set-top terminal from continuing to indefinitely devote resources to the download of the designated object when, for whatever reason, the object is not being broadcast or the terminal is no long receiving the data stream on which the object is being carouseled.

         In the present invention, as shown in Fig. 3, a timer is configured to measure

15   the elapsed time between acquisition of sequential segments or packets of the object being downloaded. This is important because the terminal (102), under the present invention, need no longer begin the download by waiting to acquire segment 0. Consequently, if more than a predetermined period of time elapses between the reception of segments of the object, the terminal (102) will assume that the

20   transmission of the object has been discontinued or otherwise interrupted and will cease trying to acquire the object. The processor (111; Fig. 1) can contain, operate and reset the timer as needed.

         As shown in Fig. 3, after the specified data transport stream has been tuned (207) or the appropriate URL addressed (207A), the terminal (102) waits to receive

25   the first or next data packet of either the code object being downloaded or its ECDS. When a packet is received (301), the timer is reset (303). If no next data packet is received, the terminal (102) check to see if the timer has exceeded a specified time-out limit (302). If the timer has exceeded the limit, the download is terminated (310). If the timer has not exceeded the predetermined limit, the terminal (102) continues to

30   wait for the next data packet (301) and monitor the timer (302).

After a data packet is received, the terminal (102) determines if all packets have been received (304). If not, the terminal (102) continues to wait for the next data packet (301) and monitors the timer (302). If all the packets of the object have been acquired, the terminal (102) may then acquire the packets of the ECDS. This may requiring tuning a new data transport stream or contacting a new URL before the terminal (102) resumes waiting to receive the next data packet (301). When all the packets of the object and its ECDS have been acquired, the processes passes back to step (209) in which the downloaded code object is authorized and authenticated using the ECDS.

After the object is authorized and authenticated, the object is stored (210) in memory (112) for future use by the terminal (102). Additionally, the Download Control Message of the present invention may provide an instruction as to how the object being acquired is to be stored in memory (112), for example, volatile memory, non-volatile memory or "any." The Download Control Message of the present invention may also specify, if the object is to be eventually located in Flash memory, whether the object must be located absolutely at a particular address within Flash memory. For example, in a related patent application U.S. Serial No. 60/130,328, a novel architecture is described in which the base platform code object and the operating system code object must be located at specific stack points within the Flash memory. When downloading such an object, the Download Control Message of the present invention can specify that an object must be stored at a particular location within the memory (112).

For each object that the Download Control Message directs the set-top terminal (102) to acquire, the following information should be provided in the Message: (1) the name of the object, preferably in ASCII text; (2) the version of the object; (3) the storage classification of the object, e.g., volatile memory, non-volatile memory, doesn't matter, etc.; and (4) the object size, preferably the ROMMABLE size (in bytes) of the encapsulated object not including the size of the static variable required for operation of the code object.

Additionally, in a preferred embodiment, the Download Control Message of the present invention preferably also includes the following information:

12

(1) Operating environment flag: This flag indicates the operating environment in which the Download Control Message will be executed by the set-top terminal (102) based purely on the object class of the object to be acquired, e.g., whether the object is a platform or system object. If the flag is set to "any" environment (which is the default setting), then the message will execute in either the platform object or system object environment. If the flag is set to "platform object", then the message will only execute in the platform object environment, and if the flag is set to "system object", then the message will only execute in the system object environment.

(2) Auto purge enable flag: This one-bit flag indicates whether the set-top terminal (102) is to purge from its memory (112) any older versions of the object or objects that are to be acquired in response to the Download Control Message. In other words, the auto purge enable flag can be used to direct the set-top terminal (102) to delete from memory (112) any object which is specified as an object to be acquired in the Download Control Message which also has a version number different from that specified in the Download Control Message for the object to be acquired.

(3) Auto list enable flag: This one-bit flag indicated whether the set-top terminal (102) is to automatically enable the entire list of objects in the Download Control Message after the successful acquisition of all objects listed in the message. Note that for the managed object type, "enable" means marking the file directory flag as enabled. It will be the responsibility of the App O/S to start the execution of the code object.

(4) Timeout field enable flag: This one-bit flag indicates whether a limit for the inter-segment timer and list enable timer are specified within the Download Control Message. If the timeout field enable flag is not set, default values are used for both the inter-segment and list enable timers. If the tune download function is specified to be other than "conditionally tune," this flag should be set to zero and will be ignored by the set-top terminal (102).

(5) Tune download function field: This field is used to specify whether the set-top terminal (102) is to tune to the specified download channel only if the set-top terminal (102) has not yet acquired the specified version of the code object. Once the set-top terminal (102) has acquired and activated the specified version of the code

13

object, it must autonomously detune the channel (free up the control channel packet processor). In response to a "conditional tune" subcommand in the tune download function field, the set-top terminal (102) need only acquire the object or objects specified in the Download Control Message. The set-top terminal (102) need not

5   acquire any other code object that may be transported in the PID stream except as specified in the Message.

(6) Sequence number: This field indicates when a change has occurred in the Download Control Message. For example, if an Download Control Message is received with auto enable not activated, the set-top terminal (102) will download all

10   specified code objects, but it will not enable the objects. Rather, the terminal (102) waits for a subsequent Download Control Message containing the same list and version of objects to be acquired with the auto enable flag set. The sequence number field would be used to indicate that the Message had changed, and that the set-top terminal (102) should process the Message.

15   (7) List identification field: This field is used to identify a list of code objects so that operations may be performed on the list as opposed to individually on each object in the list. An object that was previously loaded in the set-top terminal (102) with the same list identifier as in the current Download Control Message, but not included on the current list, will be deleted from the set-top along with its associated

20   Object Conditional Access Message (OCAM) information.

(8) List version field: This field is used to identify the version of the list in the Download Control Message. Together, the list identification field and the list version field will identify duplicate Download Control Message, essentially functioning as a sequence number. The list version must change whenever anything in the Download

25   Control Message changes including the tune download function field, any object information in the list, and inter-segment and list enable timer information.

(9) Number of objects field: This field indicates the number of code objects in the list to be acquired in response to the Download Control Message.

(10) VCT Identification field: This field specifies the identity of the VCT that

30   is applicable to the Download Control Message. A VCT identifier of "00 00" can be used when a download channel is defined across multiple VCT identifications (i.e.,

14

multiple headends). In this case, a home VCT identifier (as configured by the headend) will not be verified by the set-top terminal's downloader software before attempting to download the specified object or objects over the download channel information given in the Download Control Message.

5   (11) Download channel field: This field specifies the channel that the set-top terminal (102) should tune to acquire the download object or objects specified in the Download Control Message. The download channel field provides the reference from which the download PID may be determined. The download channel field may refere to an entry in the Virtula Channel Table (VCT). From that table, the download PID

10   specifying the packets of the object to be acquired can be determined.

(12) Relocatable code flag: This flag indicates whether the code object may or may not be relocated in Flash as part of de-fragmentation later in the lifetime of the set-top terminal (102). Note that all managed objects must be relocatable. Platform objects and system objects may or may not be relocatable.

15   (13) Absolute address field: This field can specify the physical address where the downloaded code object will be loaded. Only a platform object or a system object may have an absolute physical address.

(14) Object identifier field: This field provides a unique identifier for the object or objects to be acquired by the set-top terminal (102) in response to the

20   Download Control Message.

(15) Object class field: This field provides an enumerated definition of the type of the code object identified for download. For example, the object may be a platform object. A platform object is a program that runs on and controls the set-top terminal (102) in the absence of an executing operating system (O/S). Typically, a

25   platform object provides the set-top terminal (102) with only basic functionality such as receiving television signals. The platform object should also enable the set-top terminal (102) to authorize, receive, authenticate and implement an operating system. Alternatively, the object may be a system object, i.e., an operating system (O/S) for the set-top terminal, or an application or managed object which is a program that runs

30   under the operating system to provide additional features for the set-top terminal such as e-mail or an electronic program guide.

15

(16) Table extension field: This field is used by the decoder to differentiate between various message images that may be present simultaneously on the transport multiplexed data stream for one message type. It is the same table extension value found in each private message header for segmented messages. The download object header itself is found only in segment 0 of the message. By carrying the table extension in the Download Control Message, the set-top terminal (102) is able to begin downloading the object on the first segment received (any segment of the object). Moreover, it is not necessary to repeat segment 0 throughout the message. If there is only one object per download PID, the table extension field may be set to zero. In this case, the downloader will acquire all segments on the given download PID.

(17) Inter-segment timer field: This field provides information for the first of two watchdog timers that may be used with a conditional tune subcommand. The inter-segment timer tracks the elapsed time before the reception of the first and each successive segment of the code object being downloaded. Reception of the first code segment represents the real start of object acquisition and insures that the download is proceeding – i.e., another segment of the download message is received within the specified time limit. If the timer expires before the next segment is received, then the download is aborted. Note that the time to receive the first segment is measured from the receipt of the Download Control Message, including time to authorize the list of objects. This field may specify a time limit to be used by the inter-segment timer or may direct the timer to use a pre-specified default time limit.

(18) List enable timer field: This field provides information for the second watchdog timer that may be used with a conditional tune subcommand. This timer tracks the reception of the ENABLE subcommand for the target object(s) that marks the completion of object acquisition and initiation. This timer will be used to hold the download stream open until all "enables" for all objects have been received. If the timer expires before the list enables are received, then the download is aborted. If the auto-enable flag is set, this timer sets the time limit to receive all objects in the object list. Again, this field may specify a time limit to be used by the inter-segment timer or may direct the timer to use a pre-specified default time limit.

The preceding description is merely exemplary and is not intended to limit the scope of the present invention. Those of skill in the art will recognize various modifications and ramifications of the principles of the present invention as described herein. All such details are encompassed by the present invention.

GEN-079

What is claimed is:

1. A method of controlling the downloading of code and data objects by a set-top terminal in a cable television system, the method comprising transmitting a download control message to said set-top terminal, wherein said download control message specifies an object to be downloaded, a size of said object and a location of said object such that said set-top terminal is enabled to commence downloading said object upon receipt of said download control message.

2. The method of claim 1, wherein said location of said object specified by said download control message includes a channel of a transport stream on which said object is transmitted and a packet identifier identifying data packets of said object within said transport stream.

3. The method of claim 1, wherein said location of said object specified by said download control message includes a URL at which said object is stored.

4. The method of claim 1, wherein said object is a programming code object for execution by said set-top terminal, said method further comprising downloading said code object in accordance with said download control message.

5. The method of claim 4, wherein said download control message further specifies an entitlement control data structure associated with said programming code object, said method further comprising downloading said entitlement control data structure in accordance with said download control message.

6. The method of claim 5, further comprising authenticating and authorizing said downloaded code object using said downloaded entitlement control data structure.

7.   The method of claim 1, further comprising:

downloading said object in accordance with said download control message;

and

terminating said downloading if a timer exceeds a set limit prior to receipt of a

next successive data packet of said object.

8.   The method of claim 1, further comprising:

specifying, with said download control message, an operating environment of

said set-top terminal in which said terminal is to respond to said download control

message; and

downloading said object in accordance with said download control message

only if said set-top terminal is in said operating environment specified by said

download control message.

9.   The method of claim 1, further comprising embedding said download

control message in an entitlement management message that is transmitted from a

headend facility to said set-top terminal.

10.   The method of claim 1, further comprising:

specifying with said download control message an address or characteristic of

said set-top terminal; and

downloading said object in accordance with said download control message

only if said set-top terminal bears an address or characteristic matching the address or

characteristic specified in said download control message.

11.   A system for controlling the downloading of code and data objects by a

set-top terminal in a cable television system, the system comprising:

a set-top terminal connected to a cable television system; and

means for transmitting a download control message to said set-top terminal;

wherein said download control message specifies an object to be downloaded,

a size of said object and a location of said object such that said set-top terminal is

enabled to commence downloading said object upon receipt of said download control message.

12. The system of claim 11, wherein said location of said object specified by said download control message includes a channel of a transport stream on which said object is transmitted and a packet identifier identifying data packets of said object within said transport stream.

13. The system of claim 11, wherein said location of said object specified by said download control message includes a URL at which said object is stored.

14. The system of claim 11, wherein said object is a programming code object for execution by said set-top terminal, and said set-top terminal further comprises means for downloading said code object in accordance with said download control message.

15. The system of claim 14, wherein said download control message further specifies an entitlement control data structure associated with said programming code object, and said set-top terminal further comprises means for downloading said entitlement control data structure in accordance with said download control message.

16. The system of claim 15, wherein said set-top terminal further comprises means for authenticating and authorizing said downloaded code object using said downloaded entitlement control data structure.

17. The system of claim 11, wherein said set-top terminal further comprises:
means for downloading said object in accordance with said download control message; and

means for terminating said downloading if a timer exceeds a set limit prior to receipt of a next successive data packet of said object.

18.   The system of claim 11, wherein:

said download control message further specifies an operating environment of said set-top terminal in which said terminal is to respond to said download control message; and

said set-top terminal will download said object in accordance with said download control message only if said set-top terminal is in said operating environment specified by said download control message.

19.   The system of claim 11, wherein said download control message is embedded in an entitlement management message that is transmitted from a headend facility to said set-top terminal.

20.   The system of claim 11, wherein:

said download control message specifies an address or characteristic of said set-top terminal; and

said set-top terminal further comprises means for comparing said address or characteristic from said download control message to an address or characteristic of said set-top terminal, wherein said set-top terminal downloads said object in accordance with said download control message only if said address or characteristic of said set-top terminal matching the address or characteristic specified in said download control message.

GEN-079

ABSTRACT

A Download Control Message instructs a set-top terminal in a cable television system to located and immediately begin downloading a code or other data object available over the cable system. The Download Control Message specifies, for example, the size, name, version and location (URL or transport stream and PID) of the object to be acquired by the set-top terminal. The terminal accordingly can begin immediate acquisition of the object. An address or other characteristic associated with the Download Control Message allows the system operator to target the Message to a particular set-top terminal or group of terminals.

5

10

DC033434

Fig. 1

Headend sends
Download Control
Message
201

Download Control
Message received by set-
top terminal
202

Address or
preamble characteristic from
message matches terminal?
203

NO

YES

Message
contains operating
evnironment flag?
204

YES

Flag matches
terminal's operating
environment?
205

NO

NO

Extract download information
from Message
206

YES

Tune specified download
channel and locate data
transport stream
207

Acquire packets of object and
corresponding ECDS
208

Authenticate and authorize
object using ECDS
209

Store object in memory
210

Fig. 2

```
                    ┌──────────────────┐
              ┌────▶│  Headend sends   │◀──────────────────┐
              │     │ Download Control │◀──────┐           │
              │     │     Message      │       │           │
              │     │       201        │       │           │
              │     └──────────────────┘       │           │
              │              │                 │           │
              │              ▼              NO │           │
              │     ┌──────────────────┐       │           │
              │     │ Download Control │       │           │
              │     │Message received by set-  │           │
              │     │   top terminal   │       │           │
          NO  │     │       202        │       │           │
              │     └──────────────────┘       │           │
              │              │                 │           │
              │              ▼                 │           │
              │          ╱─────────╲           │           │
              │        ╱   Address or  ╲       │           │
              └──────╱ preamble characteristic from         │
                     ╲ message matches terminal? ╱          │
                       ╲      203      ╱         │          │
                         ╲───────────╱           │          │
                              │                  │          │
                           YES│                  │          │
                              ▼                  │          │
                          ╱───────╲          ╱────────╲     │
                        ╱  Message  ╲      ╱   Flag matches ╲
                       ╱  contains operating ╲───YES──▶╱ terminal's operating ╲
                       ╲  evnvironment flag? ╱         ╲  environment?  ╱
                        ╲     204   ╱                   ╲     205    ╱
                          ╲───────╱                       ╲────────╱
                              │                              │
                           NO │                              │
                              ▼                              │
                     ┌──────────────────┐                   │
                     │Extract download information│◀──YES────┘
                     │   from Message   │
                     │       206        │
                     └──────────────────┘
                              │
                              ▼
                     ┌──────────────────┐
                     │Connect to specified URL│
                     │       207A       │
                     └──────────────────┘
                              │
                              ▼
                     ┌──────────────────┐
                     │Acquire packets of object and│
                     │ corresponding ECDS │
                     │       208        │           ╔═══════════╗
                     └──────────────────┘           ║  Fig. 2A  ║
                              │                      ╚═══════════╝
                              ▼
                     ┌──────────────────┐
                     │Authenticate and authorize│
                     │ object using ECDS │
                     │       209        │
                     └──────────────────┘
                              │
                              ▼
                     ┌──────────────────┐
                     │Store object in memory│
                     │       210        │
                     └──────────────────┘
```
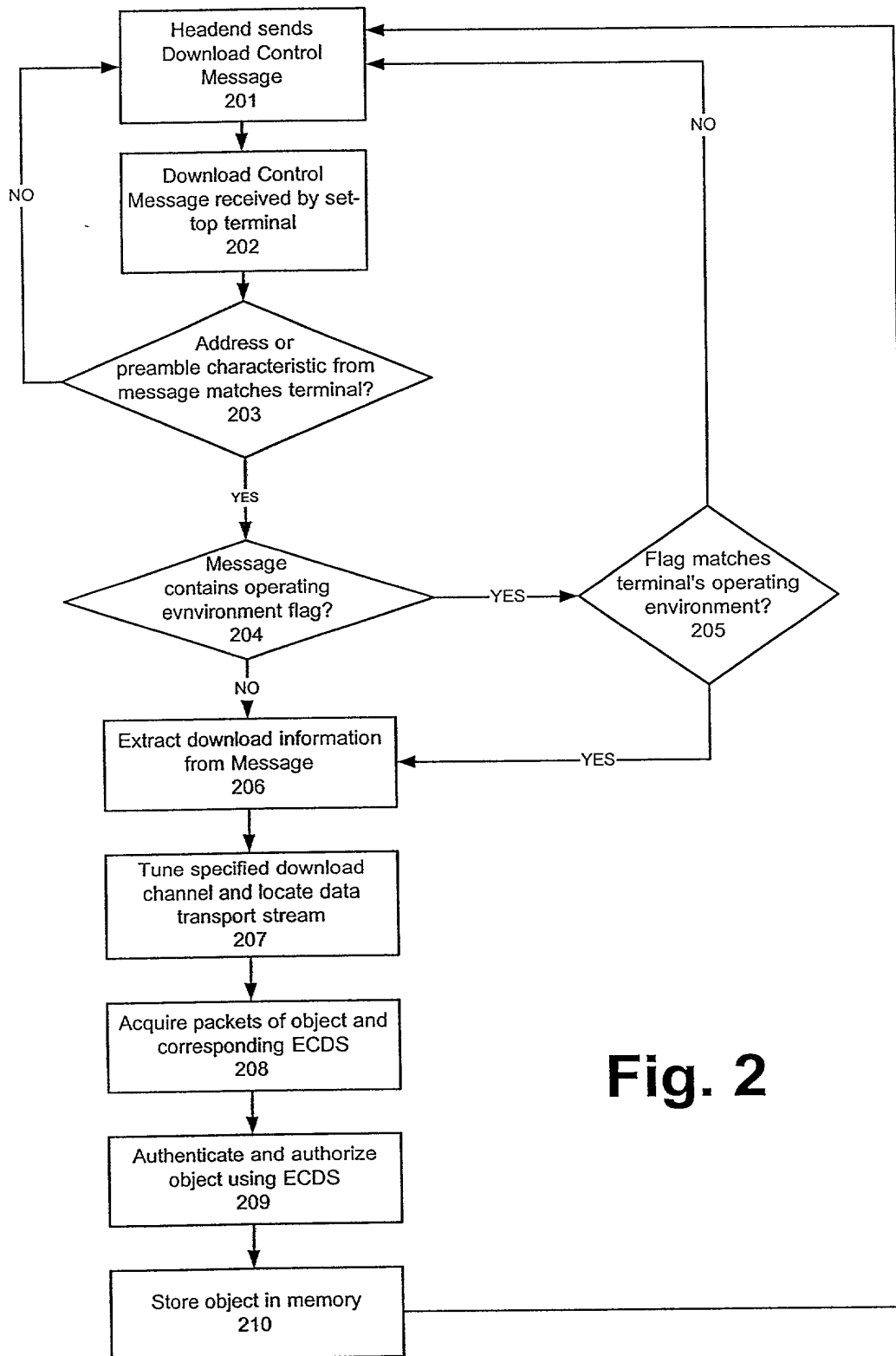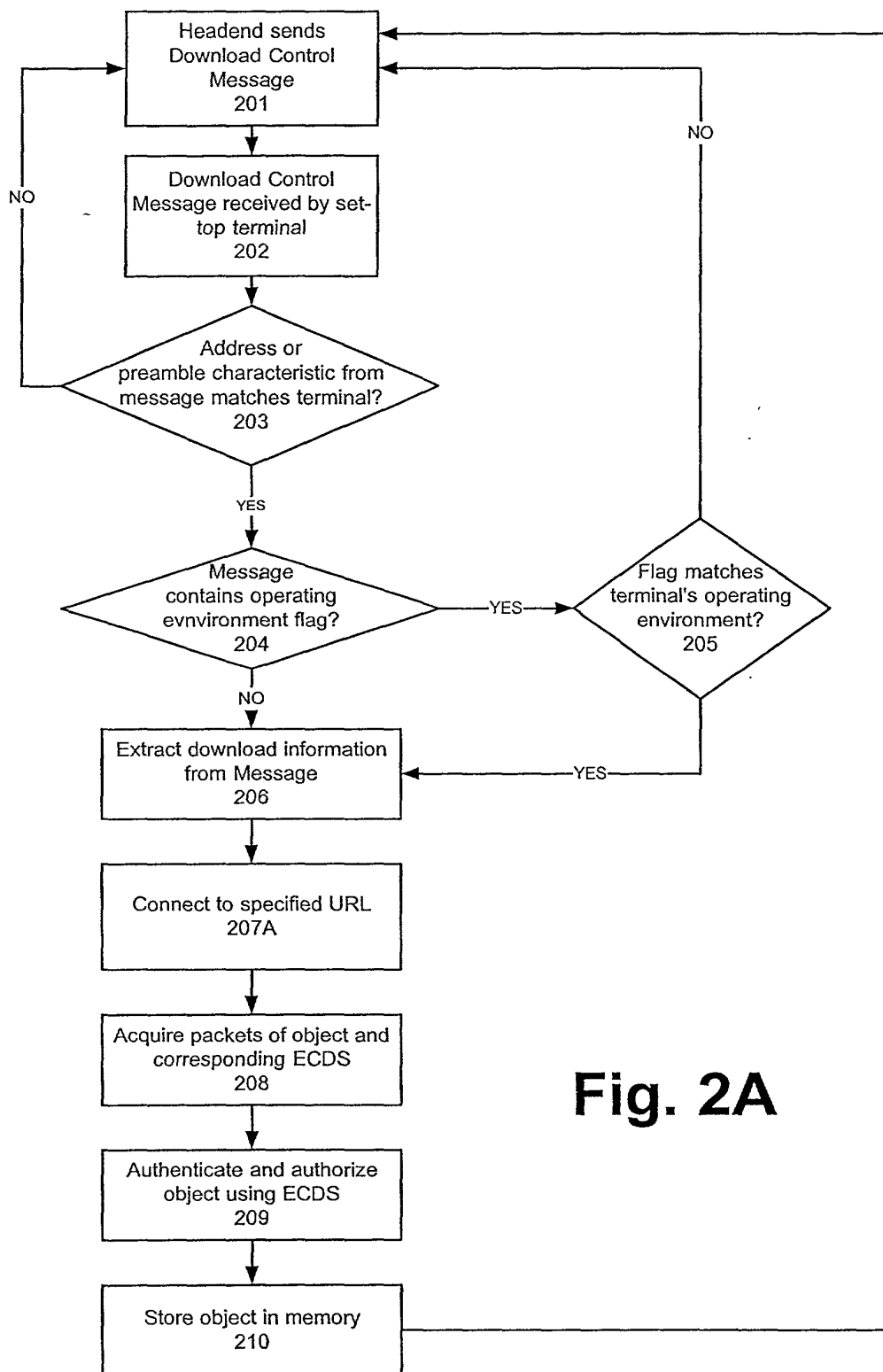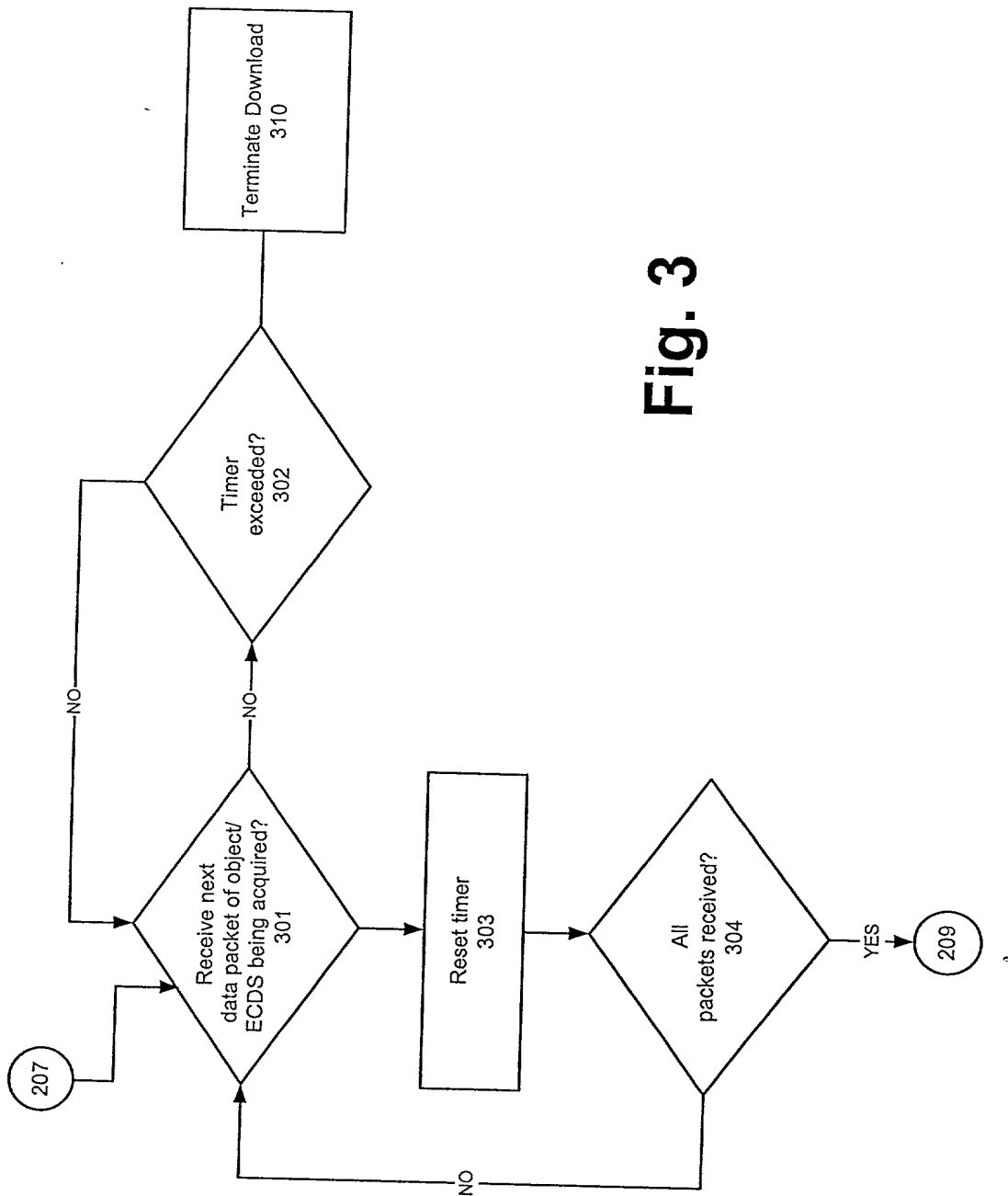
Fig. 3

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION
English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

METHOD AND SYSTEM FOR DIRECTING THE DOWNLOAD OF SOFTWARE AND FIRMWARE OBJECTS OVER A NETWORK SUCH AS A CABLE TELEVISION SYSTEM

the specification of which

(check one)
X is attached hereto.

was filed on _____ as

Application Serial No. _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent of inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)   Priority Claimed

(Number)	(Country)	(Day/Month/Year Filed)	☐ Yes	☐ No
(Number)	(Country)	(Day/Month/Year Filed)	☐ Yes	☐ No
(Number)	(Country)	(Day/Month/Year Filed)	☐ Yes	☐ No

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 and 1.63(d) which became available between the filing date of the prior application and the national or PCT international filing date of this application:

60/152,286   **September 3, 1999**   **Pending**
(Application Serial No.)   (Filing Date)   (Status)
                                                              (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1

English Language Declaration

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Ronald P. Kananen, Reg. No. 24,104; Ralph T. Rader, Reg. No. 28,772; Michael D. Fishman, Reg. No. 31,951, Richard D. Grauer, Reg. No. 22,388; Joseph V. Coppola, Sr., Reg. No. 33,373; Michael B. Stewart, Reg. No. 36,018; John W. Rees, Reg. No. 38,278
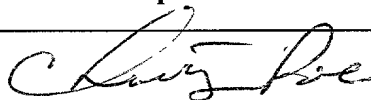
Send Correspondence to:

Direct telephone calls to:

Ronald P. Kananen, Esq.
RADER, FISHMAN & GRAUER
The Lion Building
1233 20th Street, N.W., Suite 501
Washington, D.C. 20036

Ronald P. Kananen, Esq.
(202) 955-3750

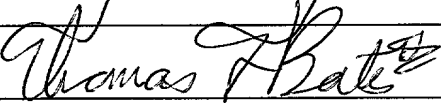|	
Full name of first joint inventor **Christopher POLI**	
First Inventor's signature	Date 6-29-00
Residence **Doylestown, PA 18901**	
Citizenship **USA**	
Post Office Address **2607 Red Gate Drive**	
Doylestown, PA 18901	
Full name of second joint inventor **Christopher S. DEL SORDO**	
Second Inventor's signature	Date 7/10/00
Residence **Souderton, PA 18964**	
Citizenship **USA**	
Post Office Address **229 Heatherfield Drive**	
Souderton, PA 18964	
Full name of third joint inventor **Douglas S. MAKOFKA**	
Third Inventor's signature	Date 6/29/00
Residence **Willow Grove, PA 19090**	
Citizenship **USA**	
Post Office Address **516 Fairhill Street**	
Willow Grove, PA 19090	

Full name of fourth joint inventor **Jack BIRNBAUM**	
Fourth Inventor's signature *Jack Birnbaum*	Date *6/30/00*
Residence **Southampton, PA 18966**	
Citizenship **USA**	
Post Office Address **559 Nicole Drive**	
Southampton, PA 18966	
Full name of fifth joint inventor **Thomas F. BATES IV**	
Fifth Inventor's signature	Date
Residence **Richboro, PA 18954**	
Citizenship **USA**	
Post Office Address **115 Tanyard Road**	
Richboro, PA 18954	
Full name of sixth joint inventor **Dave PREZUHY**	
Sixth Inventor's signature *David A. Prezuhy*	Date *7/12/00*
Residence *CHALFONT PA 18914*	
Citizenship **USA**	
Post Office Address *3398 PIN OAK LANE*	
CHALFONT, PA 18914	
Full name of seventh joint inventor **Ira S. LEHRMAN**	
Seventh Inventor's signature	Date
Residence **West Windsor , NJ 08550**	
Citizenship **USA**	
Post Office Address **22 Barrington Street**	
West Windsor, NJ 08550	

R0085094 DOC

3

Full name of fourth joint inventor **Jack BIRNBAUM**	
Fourth Inventor's signature	Date
Residence **Southampton, PA 18966**	
Citizenship **USA**	
Post Office Address **559 Nicole Drive**	
Southampton, PA 18966	
Full name of fifth joint inventor **Thomas F. BATES IV**	
Fifth Inventor's signature *Thomas F. Bates*	Date 7/15/00
Residence **Richboro, PA 18954**	
Citizenship **USA**	
Post Office Address **115 Tanyard Road**	
Richboro, PA 18954	
Full name of sixth joint inventor **Dave PREZUHY**	
Sixth Inventor's signature	Date
Residence	
Citizenship **USA**	
Post Office Address	
Full name of seventh joint inventor **Ira S. LEHRMAN**	
Seventh Inventor's signature	Date
Residence **West Windsor , NJ 08550**	
Citizenship **USA**	
Post Office Address **22 Barrington Street**	
West Windsor, NJ 08550	

Full name of fourth joint inventor **Jack BIRNBAUM**	
Fourth Inventor's signature	Date
Residence **Southampton, PA 18966**	
Citizenship **USA**	
Post Office Address **559 Nicole Drive**	
Southampton, PA 18966	
Full name of fifth joint inventor **Thomas F. BATES IV**	
Fifth Inventor's signature	Date
Residence **Richboro, PA 18954**	
Citizenship **USA**	
Post Office Address **115 Tanyard Road**	
Richboro, PA 18954	
Full name of sixth joint inventor **Dave PREZUHY**	
Sixth Inventor's signature	Date
Residence	
Citizenship **USA**	
Post Office Address	
Full name of seventh joint inventor **Ira S. LEHRMAN**	
Seventh Inventor's signature *Ira S Lehrman*	Date 7/5/2000
Residence ~~West Windsor, NJ 08550~~ 10976 Puma Run, Littleton Co 80124	
Citizenship **USA**	
Post Office Address **22 Barrington Street**	
West Windsor, NJ 08550	

R0085094.DOC